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(54) **Paint spray gun comprising an even-pressure diverting housing structure**

(57) The present invention provides a paint spray gun comprising an even-pressure diverting housing structure formed by an inner housing and an outer housing located in the paint spray gun head. The centers of both housings comprise holes for a paint spray gun nozzle which is assembled together with the housings into a set. The inner housing and the outer housing comprise two independent guiding gas channels for conducting paint atomisation airflow and jet forming airflow. Gaps of each guiding gas channel are cross-positioned. As the inner housing and outer housing are combined the channels of the two housings maintain the crossing relationship, thereby the atomisation airflow and the jet forming airflow form a circulating stream in the two guiding gas channels in both housings to achieve an even-exiting air stream improving the painting quality.

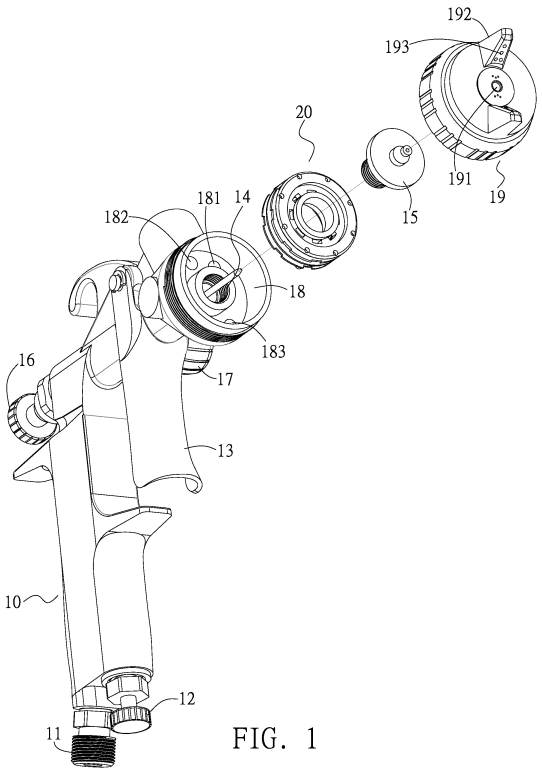

FIG. 1

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Description

Field of the present invention

[0001] The present invention is a paint spray-gun even-pressure diverting housing structure, mainly through the gap crossing position guiding style design of its diverting housing so that its airflow is able to circulate through and extend its time in staying in the cavity of the spray-gun head. In this way the spraying paint airflow and atomization airflow are spit out evenly from the spitting hole of air outlet in the center of the spray-gun housing and both sides of the flank section.

Description of prior art

[0002] It is normal in the structural design of paint spray-gun mainly to install a spray-gun main body suitable for holding in hand. At the lower side of the handle of the main body a connector is installed for connecting to the air compression device, and another knob is installed to control the inlet air volume in order to adjust the degree of paint atomization accommodating with the pressing handle installed on the upper cavity section of the handle section for the control of the trigger cross installed in the cavity section of the main body in order to control the opening of the nozzle on the front. And with the controlling knob at the back of the cavity section of the main body, the strength of the pressing force and the amplitude of the opening can be varied. Also, another adjustment knob is installed at the back of the cavity section of the main body for the control of the outlet air volume of spray-gun housing at the front. Based on the basic functional structure of such kind of paint spray-gun, it is possible to control the opening of nozzle through the trigger by pressing or releasing of handle to match with the internal airflow passing through the channel by using the air compression device to spit out the inlet air from the nozzle, and to guide the paint in the paint container to spit out while releasing the air, thereby the lateral air spitting installed at the flank section protruding on both sides of the spray-gun housing allows that the paint is atomized evenly painted on the work object. Meanwhile, depending on the requirement of the work object and working environment the atomizing result of the paint is varied through the adjusting of lateral spitting air volume of the spray-gun housing by adjustment knob to further obtain the best painting operational quality.

[0003] The design of guiding the spitting airflow is mainly achieved in the design of a spitting paint hole and an atomizing air hole inside the nozzle cavity of the spray-gun and through the two sets of independent guiding gas channels installed on the diverting housing. The paint airflow guided by the spitting air hole through the guiding gas channel in the diverting housing internal area is blown out from air outlet of the center of spray-gun housing while at the same time spitting out the guided paint to achieve the function of spreading the paint. And the atomization airflow guided by the atomizing hole is spitted out from the protruding flank sections installed on both sides of the spray-gun housing through the guiding of guiding gas channel and squeeze the paint into the atomizing effect.

[0004] However, the previously described diverting action is mainly achieved through the isolation of the spraying paint airflow blown out from the spraying paint air hole and the atomization airflow spit out from the atomizing air hole so that both airflow are not interfered with each other and guided through the planned route. Therefore, the guiding gas channels are installed in penetrating style. In this way, as the spraying paint airflow and the atomization airflow are spit out from their respective holes, they are blown out from the air outlet and spitting hole directly through the guiding gas channel of diverting housing. Due to the missing of even pressure design and adding the strengths of air pressures guided from the spray-gun might not be the same, leading the outlet air might be unstable. Hence, the spraying paint volume and the stability of atomization airflow are seriously affected, resulting in the quality of praying paint hard to maintain and indeed requires to be resolved and improved.

DESCRIPTION OF THE INVENTION

[0005] In view of the problems existing in the spraying operation of spray-gun to obtain even pressure result when the spraying paint airflow and atomization airflow are guided and spit out, leading to difficulty in maintaining stability, the inventor engaged in the research of improvement. Due to many years of experience in related industry and technique, the paint spray-gun even-pressure diverting housing structure is further invented with the purpose of improving the design of structure to increase the spraying range of the atomization airflow when the paint is just sprayed out in diverting structure in order to effectively squeeze the paint to form more even long and flat spraying style.

[0006] The other objective of the present invention is in the design of structural plan of diverting airflow housing that enables the paint airflow and atomization airflow of the spray-gun to go through the diverting housing in circulating manner, thereby extending the staying time and obtain even pressure spitting result, making the spraying of paint more evenly distributed.

[0007] These and other objectives are solved by a paint spray-gun even-pressure diverting housing structure according to claim 1. Advantageous embodiments are subject of the dependent claim.

[0008] The diverting housing of the present invention uses the composite model of inner housing and outer housing wherein an isolation ring existed in the inner lateral face of the inner housing in order to isolate the spraying paint air hole and atomization air hole installed in the spray-gun head cavity of the spray-gun. Within the radius of the isolation ring, a reserved number of guiding steam gap holes are installed, and the inlet and outlet of the

guiding stream gap holes are presenting non-penetrating crossly located guiding style. And in the peripheral edge of the inner housing an airflow circulation tank is formed. In addition, the peripheral edge of inner side plate of airflow circulation tank is isolated and installed with a reserve number of inlet tank, whereas the outer side plate of the airflow circulating tank is cross-inserted penetratingly with a reserved number of outlet holes from the position of the bottom of the tank. Also, the inner side of the outer housing forms a pair of dual isolation rings, whereas a number of reserved guiding steam air holes are installed in the circulating tank of the isolation ring, and a the outer housing is compositely covered on the outside of the inner housing, the guiding steam air hole and the exit of the guiding steam gap hole of the inner housing form a crossing relationship. The outer peripheral of the outer housing also forms an airflow circulation tank. The peripheral edge of the inner plate of the airflow circulating tank is installed with a reserved number of inlet tanks in isolated style while at the cross inserted position of the inlet tank of the outer side plate of the airflow circulating tank is installed with a reserved number of outlet gas holes. With such airflow guiding holes planned by the airflow guiding structure of inner housing and outer housing, the spraying paint airflow and the atomization airflow of the paint spray-gun is presenting circulating flow and achieves outlet air effect in order to increase its paint quality.

BRIEF DESCRIPTION OF DRAWINGS

[0009]

Figure 1 is the explosive drawing of the structure of the preferred embodiment of the present invention.
Figure 2 is the drawing of the structure of the diverting housing of the preferred embodiment of the present invention before assembly.
Figure 3 is another view of the diverting housing of the preferred embodiment of the present invention before assembly.
Figure 4 is the drawing of assembly of the diverting housing of the preferred embodiment of the present invention.
Figure 5 is the structural relationship of the flowing state of airflow of the preferred embodiment of the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENT

[0010] Regarding the structural constituents, technical means, and functions achieved of the present invention, please refer to the drawings for further descriptions of the embodiment of the present invention:

[0011] Figure 1 is the drawing of local structure of the present invention. The drawings of the structure of Figures 2 and 3 and the drawings of structural relationship of Figures 4 and 5 are the preferred embodiment of the present invention. As shown in the drawings, the structural design of the present invention is mainly in a spray-gun main body (10) suitable for holding in hand, where in the lower end of the spray-gun main body (10) a connector (11) is installed for connecting to a unit of an air compression device, and the side is installed with an inlet knob (12) for adjusting the volume of inlet air. Together with the pressing handle (13) installed at the cavity section of the upper end of the handle section, the trigger (14) crossly installed at the cavity section of the main body (10) is used for the control to open the nozzle (15) at the front end, and with the controlling knob (16) at the back end of the cavity section of the main body (10), the controlling force and opening amplitude can be adjusted. Again, at the end of the cavity section or on the other side of the spray-gun main body (10) another adjustment knob (17) is installed for control of diverting volume of spraying paint airflow and atomization airflow guided by the internally planned main channel (not shown) and secondary channel (not shown) in order to adjust the air volume spit out from spraying paint air hole (181) and atomizing air hole (182) from the of spray-gun head cavity (18) and again through the action of partitioned guiding airflow of the diverting housing (20) internally installed in the spray-gun head cavity (18), the airflow blown out respectively from the air outlet (191) of the center of the spray-gun housing (19) and the spitting hole (193) installed protruding from the flank section (192) on both sides to achieve its control function of atomized spraying paint, constituting the basic functional structure of the spray-gun of the present invention.

[0012] The diverting housing (20) is a composite form of an inner housing (21) and an outer housing (22), and the outer diameter of the inner housing (21) and outer housing (22) are in closely matched state with the inner diameter of the cavity (18) of spray-gun head and the passing holes (211), (221) are installed respectively in the center of inner and outer housing (21), (22) in order for the front end of the trigger (14) to pass through the nozzle (15) slotting unit. The inside face of inner housing (21) forms an isolation ring (212) that covers the spraying paint air hole (181) and on one side of the location a protruding pillar (213) is installed to catch the positioning hole (183) for installation on the spray-gun head cavity (18) so that when the inner housing (21) is inserted into the spray-gun head cavity (18) so that the protruding pillar (213) is clicked on the positioning hole (183), the previously state isolation ring (212) is used to isolate the spraying paint air hole (181) and atomizing air hole (182). Within the inner radius of the isolation ring (212) a reserved number of guiding airflow gap holes (214) are installed, and the inlet (1) and outlet (2) of the guiding airflow gap holes (214) are presenting non-penetrating crossly located guiding style. And the outer peripheral edge of the inner housing (21) forms an airflow circulating tank (215). Therein the peripheral edge of inside plate of the airflow circulating tank (215) using partitioned style is installed with reserved number of inlet tanks (216), and the outside

plate of the airflow circulating tank (215) from the tank bottom cross positioned into the inlet tank (216) is installed with reserved number of outlet gap holes (217) and again the outside of the inner housing (21) is installed with a positioning hole (218) for the protruding pillar (222) on outside of the outer housing (22) to insert in order to obtain flip connecting position. The inside face of the outer housing (22) forms a pair of dual isolation rings (223), wherein the circular tank (224) of the isolation rings (223) are installed with reserved number of guiding airflow air holes (225) and when the outer housing (22) covers on the outside of the inner housing (21), the guiding airflow air holes (225) is presenting cross away relationship with the outlet (2) of the guiding airflow air holes (214) of inner housing (21). And the outside peripheral edge of the outer housing (22) also forms an airflow circulating tank (226) wherein the inner plate peripheral edge of the airflow circulating tank (226) is installed in partitioned style a reserved number of inlet tank (227), and the outside plate of the airflow circulating tank (225) in cross position is penetratingly installed with a reserved number of air outlet holes (228). The non-penetrating crossly style planned guiding gas channel of spraying paint airflow and atomization airflow consist of the guiding airflow gap holes (214) and guiding airflow holes (225) of inner and outer housing (21) (22), and the spraying paint airflow and atomization airflow consist respectively of inlet tank (216), outlet gap hole (216), inlet tank (227), and outlet hole (228). When the spraying paint airflow and atomization airflow of the spray-gun are passing through the diverting housing (20) installed inside the spray-gun cavity (18), they will present circulating style and extend their staying time and with this form diverting even pressure effect, so that the outlet air is more even and avoid the occurrence of unstable wind phenomena.

[0013] Through above described composite diverting housing (20) formed by covering inner housing (21) and outer housing (22), as the outer diameter and the inner diameter of the spray-gun head cavity (18) is presenting closely matching relationship, the airflow will pass through the channel formed by the guiding gas channel installed by the diverting housing (20). In other words, as the spraying paint airflow is guiding to flow out through the spraying paint air hole (181) of spray-gun head cavity (18), it is isolated by the isolation ring (212) of inner housing (21) to enable it to pass only from the inlet (1) of guiding airflow gap hole (212) through the cross positioned outlet (2) of the guiding stream gap hole (225) and guide to the guiding stream air hole (225) of outer housing (212) and finally spit out from the residual gap between the air outlet (191) of spray-gun housing (19) and the nozzle (15) and bring out the paint of the nozzle (15) by matching with the suction action. And after the atomization airflow is guided out from the atomizing hole (182) of the spray-gun head cavity (18), due to the partition of isolation ring (212) it is guided into the inlet tank (216) of the airflow circulating tank (215) of the inner housing (21), and again guided to the outer housing (22) from the outlet air gap hole (217) of outside plate of airflow circulating tank (215), then guided from inlet tank (227) of the inside plate of airflow circulating tank (226) of the outer housing (22), then guided out to the outlet air outlet (228) of airflow circulating tank (226), finally spit out from the atomizing hole (193) of the flank sections (192) on the two sides of spray-gun housing (19), achieving the atomizing function of spraying paint. And in the process of spitting out of spraying airflow and atomization airflow, due to the restriction of inner and outer housing (21) (22) of the diverting housing (20) presenting circulating style of planned guiding gas channel, the airflow will not spit out directly and enabling it to generate even pressure result during the process of circulating flow, therefore the outlet air is able to sustain stability and further achieves the result of even output air, effectively improve its paint spraying quality.

[0014] Therefore, the present invention is designed to provide a paint spray-gun even-pressure diverting housing structure formed by an inter housing and an outer housing, and the assembly is slotted into the paint spray-gun head cavity wherein the centers of both housings are respectively installed with holes for paint spray-gun nozzle cross-assembled into a set. The inner housing and the outer housing are installed using with two independent guiding gas channels for sending spraying paint airflow and atomization airflow, and the gaps of each guiding gas channel are cross-positioned in conduction. As the inner housing and outer housing are combined the channels of the two housing maintain the crossing relationship, thereby the spitted airflow and the atomization airflow spitted present circulating stream in the two guiding gas channels in both housings delay the time staying in the nozzle cavity, further to achieve even-exiting air effect and improve painting quality.

[0015] In summary, the present invention enables the paint spray-gun with more even and stable operation so as to promote paint spraying quality, particularly using the structural innovation to design diverting housing through partitioning spraying paint airflow and atomization airflow within the spray-gun head cavity in order to achieve the objective of diverting, and further using the airflow to present circulating flow and achieve the result of even pressure and improving the problem of unstable air flow of conventional design, making the spraying paint atomizing result more even and enabling the drastic improvement and sustaining in spraying paint quality. As a whole, the invention indeed is extremely good to use in the industry and with practical value.

LIST OF REFERENCE NUMBERS

[0016]

(1) Inlet
(2) Outlet
(10) Spray-gun main body
(11) Connector

(12) Inlet knob
(13) Pressing handle
(14) Trigger
(15) Nozzle
(16) Control knob
(17) Adjustment knob
(18) Spray-gun head cavity
(181) Spraying paint air hole
(182) Atomizing air hole
(183) Positioning hole
(19) Nozzle
(191) Air Outlet
(192) Flank section
(193) Atomizing hole
(20) Diverting housing
(21) Inner housing
(211) Passing hole
(212) Isolation ring
(213) Protruding pillar
(214) Guiding stream gap hole
(215) Airflow circulating tank
(216) Inlet tank
(217) Outlet hole
(218) Positioning hole
(22) Outer housing
(221) Passing hole
(222) Protruding pillar
(223) Isolation ring
(224) Circular tank
(225) Guiding stream air hole
(226) Airflow circulating tank
(227) Inlet tank
(228) Outlet hole

Claims

1. A paint spray-gun even-pressure diverting housing structure, comprising a spray-gun main body (10) suitably for holding in hand, wherein inside the main body guiding airflow and diverting channels are installed, on the lower side of a handle of the main body a connector (11) for connecting to an air compression device is installed, and on the side an air inlet knob (12) is installed for controlling inlet air volume to be released with the pressing handle (13) installed at a cavity section at the upper end of the handle section for the control of the opening of the nozzle (15) at the front of the trigger (14) cross-installed at the back of the cavity section of the main body (10), wherein in the other end of the cavity section of the main body an adjustment knob (17) is installed in order to control the interior of the spray-gun main body designed for guiding diverting volume of a spraying paint airflow and a atomization airflow passing through different airflow channels in order to vary the air volume spit from an spraying paint air hole (181) and an atomization air hole (182) of a spray-gun head cavity (18), wherein through the action of isolation of guiding airflows, the airflow is blown out from an air outlet (191) at the center of a spray-gun housing (19) and a lateral air spitting hole (193) is installed at a protruding flank section (192) on both sides in order to achieve the control function of spreading paint; and
a diverting housing (20) installed in the spray-gun head cavity (18) for guiding airflows and formed of an inner housing (21) and an outer housing (22) with the outer housing (22) positioned closer to the air outlet (191) of the spray-gun housing (19) than the inner housing (21) and with the inner and outer housing (21, 22) positioned along a spray axis passing orthogonal to and through the air outlet (191), wherein an outer diameter of the inner and outer housing (21, 22) is nearly equal to an inner diameter of the spray-gun head cavity (18) and centers of the inner and outer housings (21, 22) respectively are installed with holes (211, 221) for a front end of the trigger (14) to pass through a slot of the nozzle (15), wherein an inner side of the inner housing (21) forms an isolation ring (212) that is able to separate the spraying paint air hole (181) and the atomizing air hole (182), wherein inside the inner diameter of isolation ring (212) a number of guiding stream gap holes (214) are installed in the inner housing (21), and an inner side of the outer housing (22) forms a pair of dual isolation rings (223), wherein inside the area between the isolation rings (223) a number of guiding stream air holes (225) are installed, and the guiding stream air holes (225) form intersecting relationships with the guiding stream gap holes (214) of inner housing (21) with the guiding stream gap holes (214) and the guiding stream air holes (225) not completely overlapping viewed along the spray axis, wherein an outer peripheral edge of the inner and outer housing (21, 22) forms a respective airflow circulating tank (215, 226), wherein a peripheral edge of an inner side plate of the airflow circulating tank (215) of the inner housing (21) is installed with a number of inlet tanks or inlet holes (216), while an outer side plate of its airflow circulating tank (215) is installed with a number of outlet gas holes (217) positioned in a non overlapping manner in respect to the inlet tanks (216), wherein a peripheral edge of an inner side plate of the air circulating tank (226) of the outer housing (22) is installed with a number of inlet tanks or inlet holes (227), while an outer side plate of the airflow circulating tank (226) is installed with a number of outlet gas holes (228) positioned in a non overlapping manner in respect to the inlet tanks (227) viewed along the spray axis, wherein the spraying paint airflow and the atomization airflow, when passing through the diverting housing installed inside the spray-gun head cavity, will form flows in circulating style and have extended staying time and form diverting and even pressure effects and enable the

spraying paint to be more evenly spread.

2. Paint spray-gun even-pressure diverting housing structure according to claim 1, wherein inlets (1) and outlets (2) of the guiding stream gap holes installed in the internal peripheral of the isolating ring (212) of the inner housing (21) are non-penetrating or non-overlapping, when viewed along the spray axis.

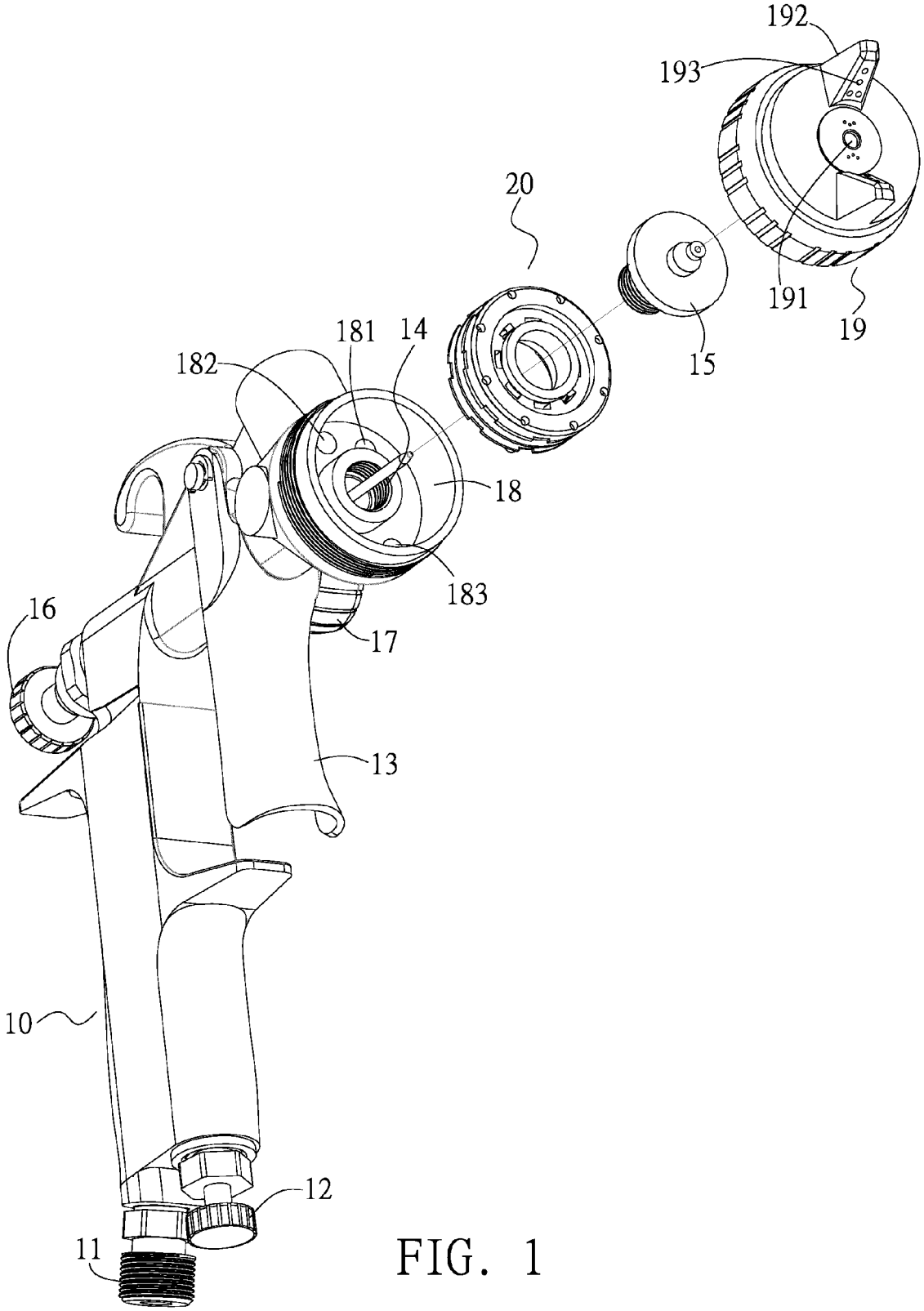

FIG. 1

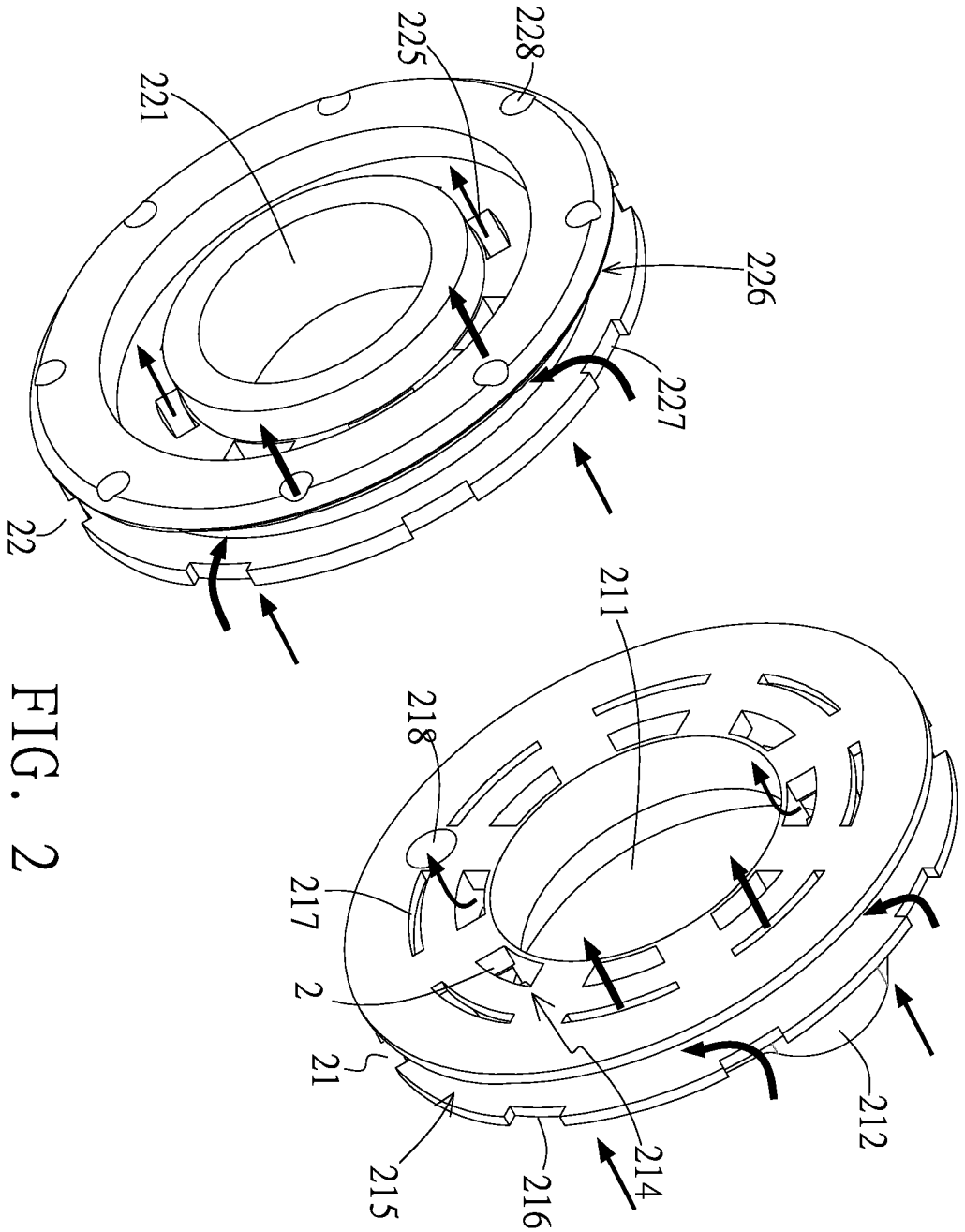

FIG. 2

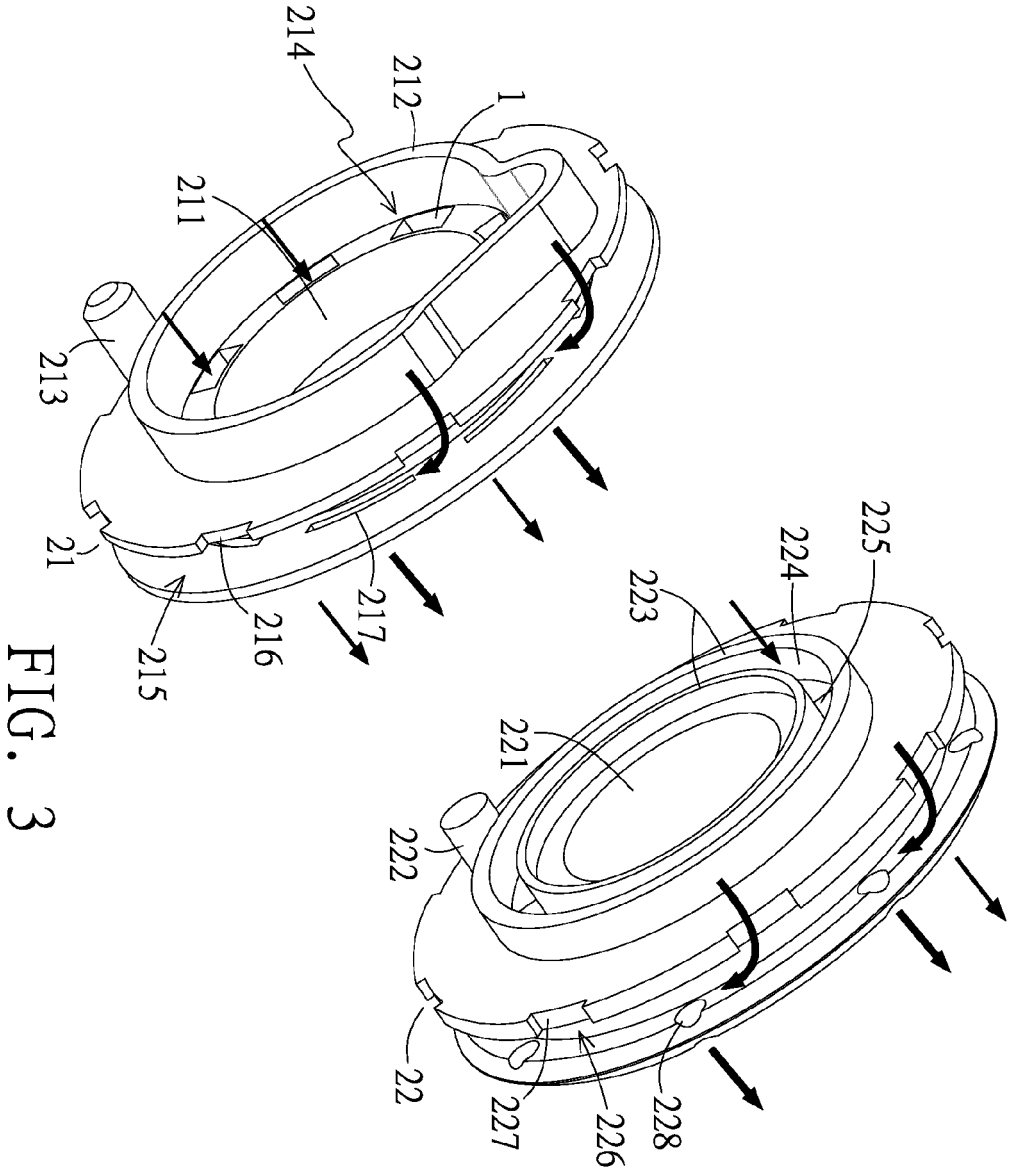
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FIG. 3

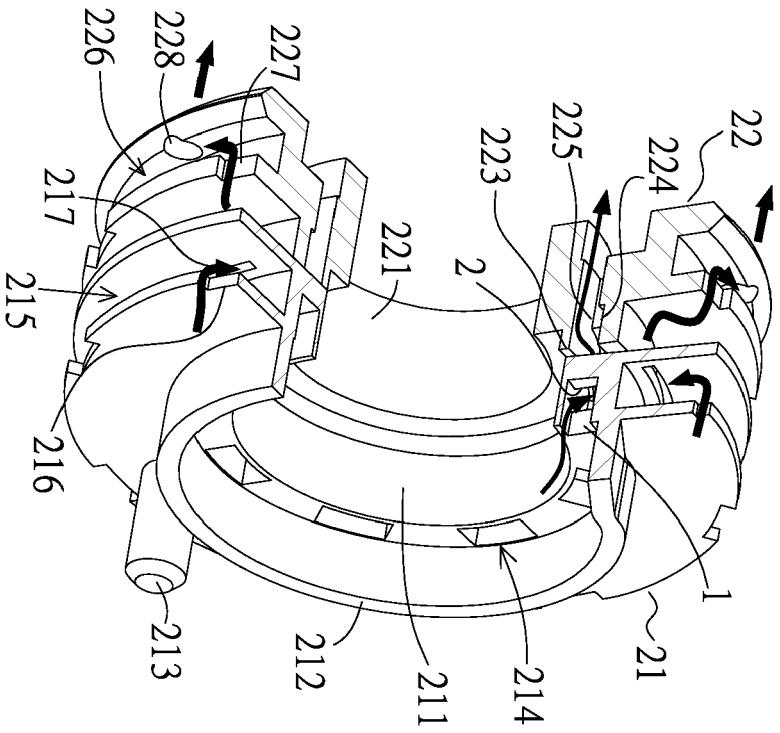

FIG. 4

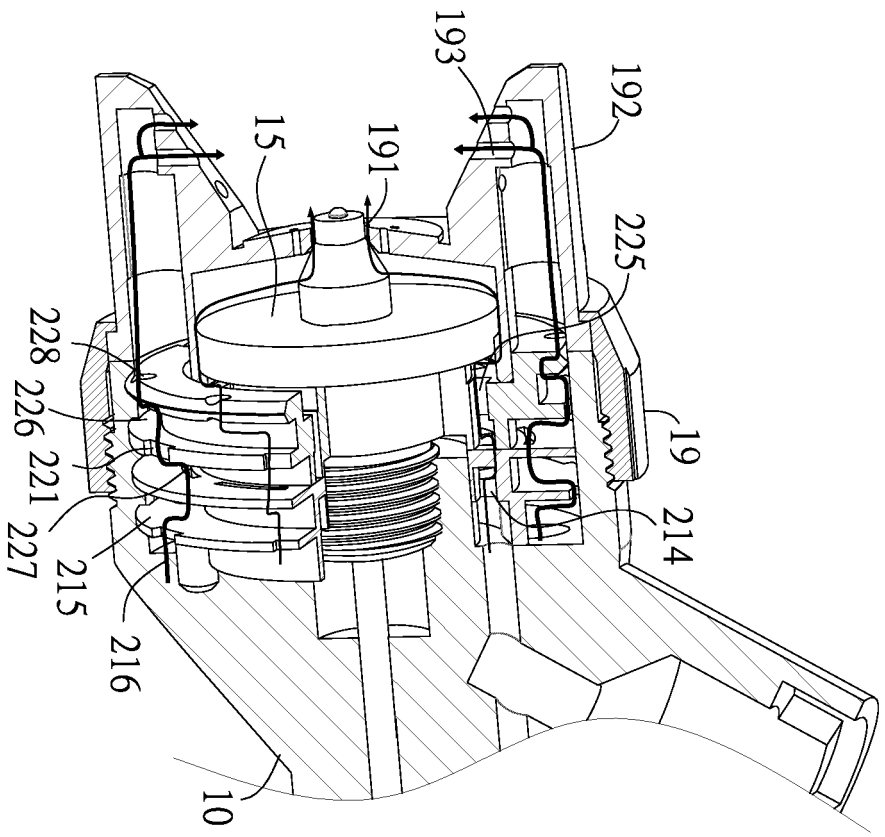

FIG. 5

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EUROPEAN SEARCH REPORT

Application Number
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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	3 June 2014	Innecken, Axel

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